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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,071	01/08/2004	Tadashi Narita	038788.53145US	5429
23911	7590	07/28/2005	EXAMINER	
CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			HU, HENRY S	
			ART UNIT	PAPER NUMBER
			1713	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/753,071	NARITA ET AL.	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Election of May 20, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-17 and 20 is/are rejected.
- 7) ☒ Claim(s) 10 and 17 is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6-3-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the faxed Election filed on May 20, 2005.

Applicant's election of Group II, Claims 4-17 and 20 is traversed with remarks on pages 1-

2. The traversal is on the ground(s) that it would not place an undue burden to search and examine the non-elected Group I (Claims 1-3) and Group III (Claims 18-19) with the elected Group II since they are so closely related in the field of fluoropolymer-containing resist composition. This is not found persuasive because each group is drawn to a technology apparently requiring search in different classification area. In the instant case Group I was drawn to an organic fluorinated compound having a moiety of formula 1 (the Examiner suggests adding the word of "unpolymerizable" in Group I to be distinguished from Group II), Group II was drawn to a fluorinated monomer having a moiety of formula 1 (claims 4-10) as well as the polymers and its use as a resist composition (Claims 11-17 and 20), while Group III was drawn to a dissolution inhibitor comprising a fluorinated compound having a moiety of formula 1.

As discussed earlier, the individual property of such a fluorinated moiety (formula 1) will not be shown totally and equally in compounds, monomers or polymers mainly due to tremendous difference in molecular weight and polymerizable/unpolymerizable features. The process of making is unique and thereby not interchangeable. It is noted that a monomer may be used as a regular organic compound rather than be used as a monomer for polymerization.

Art Unit: 1713

With the same rational, an organic compound is not necessarily used as a monomer. Therefore, the scope of the claims, i.e., the metes and boundaries are distinct.

The requirement is still deemed proper and is therefore made **FINAL**. In summary, this application contains original **Claims 1-3 and 18-19**, which is drawn to an invention non-elected with traverse. **Claims 1-20 are pending now**, while the non-elected **Claims 1-3 and 18-19** are withdrawn from consideration. An action follows.

Specification

2. The disclosure is objected to because of the following informalities:

(a) On page 8, paragraph 21 at line 13, recitation of "cyclohexanone" is wrong and may need to change to "**cyclohexanol**" in order to be consistent with the **R¹OH alcohol** mentioned in line 11.

(b) On page 38, abstract at line 7, the improper writing of "**R¹ is a straight-chain or branched alkyl or alkylene group**" may cause indefiniteness and it should be rewritten to reflect the disclosure supported by specification. Otherwise, in some cases such an improper form may mean, "(A) a straight chain, (B) branched alkyl or (C) alkylene group" in order to

Art Unit: 1713

include a simple and straight bonding in (A). Additionally, the word of "alkyl" is improper and wrong; it should be removed since R^1 is a bivalent group according to formula (1).

Appropriate corrections for (a) and (b) are required.

Claim Objections

3. Claims 10 and 17 are objected to because of the following informalities:

On **Claim 10** at monomer M6 and **Claim 17** at monomer M6, both chemical structures may be improper since R^2 has a double bond, which is contradicting with the R^2 limitation of its parent Claim 4 and Claim 11 respectively. In other word, they are out of the scope of parent Claims 4 and 11. **Rewriting is needed.**

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-17 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1713

On two parent **Claims 4 and 11 both at line 8** as well as in their dependent **Claims 5-10, 12-17 and 20**, the improper writing of “**R¹ is a straight-chain or branched alkyl or alkylene group**” may cause indefiniteness and it should be rewritten to reflect the disclosure supported by specification. Otherwise, in some cases such an improper form may mean, “(A) a straight chain, (B) branched alkyl or (C) alkylene group” in order to include a simple and straight bonding in (A). Additionally, the word of “alkyl” is improper and wrong; it should be removed since R¹ is a bivalent group according to formula (1).

The Applicants need to correct the problem of indefinite meaning, and also be consistent with the wording used in its dependent Claims 5-10, 12-17 and 20. Otherwise, it may be confusing to one having ordinary skill in the art.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1713

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. The limitation of parent *Claim 1* relates to a fluorine-containing polymerizable monomer comprising a substituent represented by the formula 1, where R^1 is (a) a straight-chain or branched alkyl or alkylene group, (b) a cyclic structure containing an aromatic ring group or aliphatic cyclic group, or (c) a substituent containing an aromatic ring group and an aliphatic cyclic group, and R^1 optionally contains fluorine, another halogen, CN, oxygen, nitrogen, silicon, or alcohol, and R^2 is a hydrogen atom, a straight-chain or branched alkyl group, an aromatic group, or a hydrocarbon group optionally containing an aliphatic cyclic group, and R^2 optionally contains fluorine, oxygen, nitrogen, carbonyl bond, or alcohol, and a plural number of R^2 having different structures are optionally contained in the molecule. See other limitations of dependent *Claims 5-17 and 20*.

7. Claims 4-5 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmori et al. (US 4,644,043 and its equivalent EP 180,913 A1) in view of Mowrer et al. (US 6,013,752).

Art Unit: 1713

Regarding the limitation of two parent **Claim 4 and 11**, Ohmori et al. have disclosed a method to produce a polymer comprising a monomer of α -fluoroacrylate having a **structure unit of $\text{CH}_2=\text{CF}-\text{C}(=\text{O})-\text{O}-(\text{CH}_2)_m-\text{CF}(-\text{X})-(\text{OCF}_2-\text{CF}(-\text{X}))_n-\text{OC}_3\text{F}_7$** , wherein X is fluorine or fluoroalkyl (C1-3), m is an integer of 1-3, and n is an integer of 0-5 (abstract, line 1-12). In a close examination, one of Ohmori's monomers may include $\text{X} = -\text{CF}_3$, while $\text{R}^2 = -\text{C}_3\text{F}_7$ and $\text{R}^1 =$ a straight chain. Since R^1 limitation of parent Claims 4 and 11 can be a straight chain according to statement on line 8, Ohmori's formula of $-\text{O}-\text{R}^1-\text{CF}_2-\text{CF}(\text{CF}_3)\text{OR}^2$ is therefore only silent about replacing F with H to become $-\text{O}-\text{R}^1-\text{CF}_2-\text{CH}(\text{CF}_3)\text{OR}^2$. In other case, Ohmori has used similar acrylic monomer but carrying partially fluorinated R^1 (column 8, line 35-36).

In a close examination on both cases, the only difference is a hydrogen atom. Mowrer et al. teach that in the course of making halogenated acrylic resin compositions, fluoroalcohols such as hexafluoro-isopropanol ($\text{CF}_3-\text{CH}(\text{OH})-\text{CF}_3$), hexafluoro-2-methylisopropanol ($\text{CF}_3-\text{C}(\text{CH}_3)(\text{OH})-\text{CF}_3$) and perfluoro-tert-butanol ($\text{CF}_3-\text{C}(\text{CF}_3)(\text{OH})-\text{CF}_3$) are functionally equivalent and interchangeable with other protonated (H-) perfluoroalcohol such as heptafluoro-propanol ($\text{CF}_3-\text{CF}(\text{OH})-\text{CF}_3$) (column 9, line 22-51; see working examples at column 15, line 54 for $\text{CF}_3-\text{CH}(\text{OH})-\text{CF}_3$ and at column 16, line 30 for $\text{CF}_3-\text{CF}(\text{OH})-\text{CF}_3$). By doing so, halogenated acrylic resin compositions with improved properties of ultraviolet light, weather, chemical, corrosion, abrasion resistance, fire resistance, hydrophobicity and substrate adhesion can be obtained (column 1, line 4-11).

Art Unit: 1713

In light of the fact that the involved references are preparing similar type of fluorinated acrylic polymers, one having ordinary skill in the art would therefore have found it obvious to **replace the fluorine atom in Ohmori's formula of $-O-R^1-CF_2-CF(CF_3)OR^2$ with a hydrogen atom** as taught by Mowrer. By this modification, one would expect to still obtain similar or even better fluoropolymers based on functionally equivalence and interchangeability between those two fluorinated moieties. Thereby a better and more diversified fluoropolymer with improved properties of ultraviolet light, weather, chemical, corrosion, abrasion resistance, fire resistance, hydrophobicity and substrate adhesion can be obtained.

8. Regarding dependent **Claims 5 and 12**, same rationale mentioned above can be applied since they are acrylic derivatives.

9. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (WO 88/09799) in view of Mowrer et al. (US 6,013,752).

Regarding the limitation of two parent **Claim 4 and 11**, Suzuki et al. have disclosed a method to produce a polymer comprising a perfluoro-acrylate having a **monomeric structure unit of $CF_2=CF-C(=O)-(OCF_2-CF(-Z'))_x-O-Z$** , wherein each of Z' and Z is fluorine or fluoroalkyl (C1-10), and x is an integer of 1-10 (page 9, line 10-15). In a close examination, one of Suzuki's monomers may include $Z' = -CF_3$ and $Z = -CF_3$. Since R^1 limitation of parent Claims 4 and 11 can be a straight chain according to statement on line 8, Suzuki's

Art Unit: 1713

formula of $-O-R^1-CF_2-CF(CF_3)OCF_3$ is therefore only silent about replacing F with H to become $-O-R^1-CF_2-CH(CF_3)OR^2$.

In short, **the only difference is a hydrogen atom**. Mowrer et al. teach that in the course of making halogenated acrylic resin compositions, fluoroalcohols such as hexafluoroisopropanol ($CF_3-CH(OH)-CF_3$), hexafluoro-2-methylisopropanol ($CF_3-C(CH_3)(OH)-CF_3$), perfluoro-tert-butanol ($CF_3-C(CF_3)(OH)-CF_3$), protonated (H-) perfluoroalcohol such as heptafluoropropanol ($CF_3-CF(OH)-CF_3$) and the like are functionally equivalent and interchangeable (column 9, line 22-51; particularly see working examples at **column 15, line 54** for $CF_3-CH(OH)-CF_3$ and at **column 16, line 30** for $CF_3-CF(OH)-CF_3$). By doing so, halogenated acrylic resin compositions with improved properties of ultraviolet light, weather, chemical, corrosion, abrasion resistance, fire resistance, hydrophobicity and substrate adhesion can be obtained (column 1, line 4-11).

In light of the fact that both of the involved references are preparing similar type of fluorinated acrylic polymers, one having ordinary skill in the art would therefore have found it obvious to **replace the fluorine atom in Suzuki's formula of $-O-R^1-CF_2-CF(CF_3)OCF_3$ with a hydrogen atom** to become $-O-R^1-CF_2-CH(CF_3)OCF_3$ as taught by Mowrer. By this modification, one would expect to succeed based on functional equivalence and interchangeability. Additionally, a better and more diversified fluoropolymer with improved properties of ultraviolet light, weather, chemical, corrosion, abrasion resistance, fire resistance, hydrophobicity and substrate adhesion can be obtained.

Art Unit: 1713

10. Claims 6-10 and 13-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmori et al. (US 4,644,043 and its equivalent EP 180,913 A1) in view of Mowrer et al. (US 6,013,752) as applied to Claims 4-5 and 11-12, and further in view of Komoriya et al. (USPG-PUB 2003/0232940 A1).

The discussion of the disclosures of the prior art of Ohmori/Mowrer for Claims 4-5 and 11-12 of this office action is incorporated here by reference. Regarding **Claims 6-10 and 13-17 and 20**, Ohmori/Mowrer is silent on the following five items: (A) making other monomeric units such as vinyl- and allyl-containing monomers as well as a monomer of formula (5) (Claims 6 and 7), (B) an acid-labile protective group for R^2 (Claims 8 and 16), (C) hexafluorocarboniol group for R^1 (Claims 9 and 13-14), (D) a norbornene derivative (Claim 15) and (E) monomers as specified (Claims 10 and 17). **Komoriya et al.** have taught all the involving limitations in the course of making fluoropolymers specifically for resist compositions. To be specific, see paragraph 61 for Claim 6 and paragraph 72 for Claim 7 in (A), see abstract for acid-labile groups as well as hexafluorocarboniol group in (B) and (C), and see norbornene structure unit is used in paragraph 164 in (D). By doing so, anti-reflection coating materials and resist compositions having a sufficiently low refractive index can be thereby obtained (paragraphs 0001 and 0002).

11. In light of the fact that all the involved references are preparing similar type of fluorinated acrylic polymers, one having ordinary skill in the art would therefore have found it obvious to modify **Ohmori/Mowrer's monomer/polymer having a structural formula of -O-**

Art Unit: 1713

R^1 -CF₂-CH(CF₃)OR² to carry other structural units as taught by Komoriya. By this modification, one would expect to obtain similar or better fluoropolymers to have a sufficiently low refractive index useful as anti-reflection coating materials and resist compositions. Additionally, the above monomers related to item (E) would become obvious to prepare.

12. Claims 5-10 and 12-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (WO 88/09799) in view of Mowrer et al. (US 6,013,752) as applied to Claims 4 and 11, and further in view of Komoriya et al. (USPG-PUB 2003/0232940 A1).

The discussion of the disclosures of the prior art of Suzuki/Mowrer for Claims 4 and 11 of this office action is incorporated here by reference. Regarding **Claims 5-10 and 12-17 and 20**, Suzuki/Mowrer is silent on the following five items: (A) using other monomeric units such as acrylic, vinyl, allyl and formula (5) (Claims 5, 6, 7 and 12), (B) an acid-labile protective group for R² (Claims 8 and 16), (C) hexafluorocarbon group for R¹ (Claims 9 and 13-14), (D) a norbornene derivative (Claim 15) and (E) monomers as specified (Claims 10 and 17).

Komoriya et al. have taught all the involving limitations in the course of making fluoropolymers specifically for resist compositions. To be specific, see paragraph 61 for Claim 6 and paragraph 72 for Claim 7 in (A), see abstract for acid-labile groups as well as hexafluorocarbon group in (B) and (C), and see norbornene structure unit used in paragraph 164 in (D). By doing so, anti-reflection coating materials and resist compositions having a sufficiently low refractive index can be thereby obtained (paragraphs 0001 and 0002).

Art Unit: 1713

13. In light of the fact that all the involved references are preparing similar type of fluorinated acrylic polymers, one having ordinary skill in the art would therefore have found it obvious to modify Suzuki/Mowrer's monomer/polymer having a structural formula of $-O-R^1-CF_2-\underline{CH}(CF_3)OR^2$ to carry other structural units as taught by Komoriya. By this modification, one would expect to obtain similar or better fluoropolymers to have a sufficiently low refractive index useful as anti-reflection coating materials and resist compositions. Additionally, the above monomers related to item (E) would become obvious to prepare.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a fluorine-containing polymerizable monomer comprising a substituent represented by the formula 1 of $-O-R^1-CF_2-CH(CF_3)OR^2$:

USPG-PUB 2002/0028886 A1 to Abe et al. discloses the preparation of a PVDF copolymer through a free radical induced aqueous emulsion polymerization with the presence of a chain transfer agent and a thermal initiator (abstract, line 1-15; pages 4-5, paragraphs 70-79). Although some co-monomers are used, key claimed monomers are not used or suggested. Therefore, Abe fails to teach or fairly suggest the limitation of present invention.

Art Unit: 1713

15. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Dr. Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Henry S. Hu

July 25, 2005


FRED TESKIN
PRIMARY EXAMINER
1713